



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 7

11201 Renner Boulevard  
Lenexa, Kansas 66219

OFFICE OF THE  
REGIONAL ADMINISTRATOR

JAN 09 2015

Mr. Peter Anderson  
Center for a Competitive Waste Industry  
313 Price Place  
Suite 14  
Madison, Wisconsin 53705

Dear Mr. Anderson:

Thank you for your letter dated January 4, 2015, commenting on Republic Service's October 20, 2014, report "Isolation Barrier Alternatives Analysis West Lake Landfill Superfund Site." The U. S. Environmental Protection Agency Region 7 will consider your comments as we make our decisions on the isolation system and during this agency's ongoing efforts to address potential risks posed by the site.

The EPA Region 7 is committed to ensuring the public is protected from the radioactive contaminants at the West Lake Landfill Superfund site. The agency bases its decisions on valid, scientific data, which we share with the community. I encourage you to visit our West Lake Landfill website for additional information: [http://www.epa.gov/region7/cleanup/west\\_lake\\_landfill/](http://www.epa.gov/region7/cleanup/west_lake_landfill/).

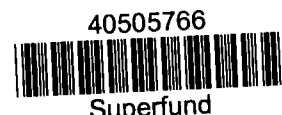
If you have additional comments please contact Lynn Slugantz at 913-551-7883.

Sincerely,

Karl Brooks

Jan. 12  
Lynn - Here is a copy of  
the letter for your  
file. - & the  
official file - showed it  
have a scanned  
Thank  
copy?  
Andy

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January 4, 2015

Mr. Karl Brooks, Regional Administrator  
U.S. Environmental Protection Agency – Region 7  
11201 Renner Blvd.  
Lenexa, Kansas 66219

Re: Westlake Landfill Superfund Site – Comments by the Center for a Competitive  
Waste Industry on Republic's Isolation Barrier Alternatives Analysis

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Dear Mr. Brooks:

This is to provide comment by the Center for a Competitive Waste Industry on Republic Service's report, "Isolation Barrier Alternatives Analysis West Lake Landfill Superfund Site," to the U.S. Environmental Protection Agency Region 7, dated October 10, 2014 (Republic Report).

We support the Missouri Department of Natural Resources' (DNR) comments on the Republic Report, dated November 24, 2014 (DNR Comments), but we have additional concerns to submit. In summary, the interminable delays in constructing the barrier, purportedly due to a need to refine the alignment of the trench, are only a delaying tactic with unacceptable risks for the people and the economy of North St. Louis.

Whatever Republic's actual motivation, its actions are those of someone engaged in a transparent effort to run out the clock on constructing that barrier, which is urgently needed to protect Area 1 from the spreading underground fire, until it gets too close to proceed. Like a *pas de deux*, the elaborate search for an elusive clean alignment to dig the trench goes, endlessly, around in circles, as nothing is done to simultaneously prepare to exhume Areas 1 and 2 as soon as the fire threat is stabilized.

In fact, there is no alignment for the barrier that would, to quote Republic, "ensure that all RIM [radiologically impacted material] is located to the north of the Isolation Barrier,"<sup>1</sup> because those wastes have already widely migrated outside of Area 1. Similar, nor is there any rational basis to assume that there is a path where a clean cut could be drawn without, as DNR pointed out, the need to long haul the contaminated spoils to a licensed nuclear waste facility,<sup>2</sup> along with training, protective gear and limited on-site exposure times for workers.

## 1

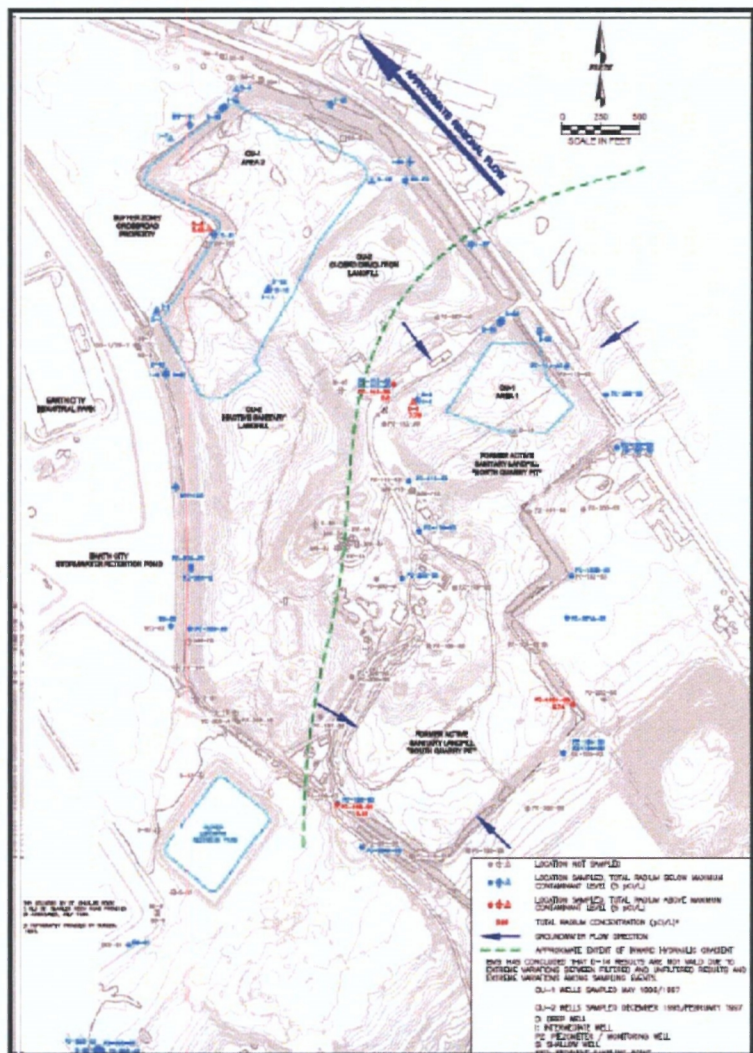
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The Westlake/Bridgeton Landfill alluvial aquifer and fractured limestone, 10 to 40 feet and leaves behind perched pools of water. Groundwater moves rapidly in the direction toward or away from the river depending upon the river stage and precipitation.<sup>4</sup>

Also, there is an additional significant influence on groundwater flows around the two quarries of the Bridgeton Landfill, which later takes on further import regarding the extent the radioactive wastes have dispersed.

Rules are supposed to require a landfill to be lined, have five feet of separation with the high water table, be outside of the flood plain and have compliant leachate removal systems, none of which exists at Bridgeton.<sup>5</sup>

In order to secure a permit in 1995 to operate this landfill in the flood plain, amidst the water table and without the required liners, the company was wrongly allowed to install noncompliant sump pumps toward the middle of each quarry in lieu of compliance. These were ostensibly intended to create an inward cone of depression among the surrounding groundwater flows in an attempt to prevent contaminants flowing outward from the landfill and into drinking water supplies.



**FIGURE 1– Map showing direction of groundwater flows from the influence of the sump pumps**



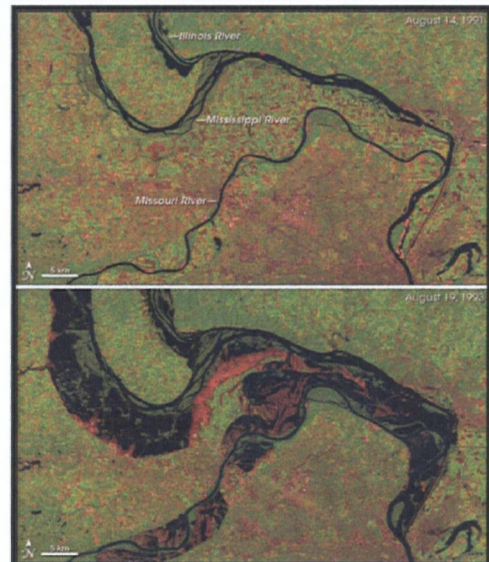
At the same time, however, these cones of depression also drew groundwater from the periphery to the middle of each quarry, which aggressively spread contamination throughout the site.<sup>6</sup> More recently, those sump pumps have had to be removed to make it possible to install the new plastic sheet, and they are being replaced with new sump pumps arrayed around the periphery of the two quarries approximately 200 feet apart.<sup>7</sup>

Essentially, because much of the waste mass is more permeable than most of the alluvial deposits, these vertical and lateral groundwater flows in the landfill have continually flushed the landfill in a back and forth action, including in Area 1, where one of the perched pools has been located.<sup>8</sup> The map in FIGURE 1 on the preceding page represents one effort to describe the direction of groundwater movement during one set of samples. Groundwater movement is shown as moving from the perimeter of the quarries to the center where the sump pumps were located, and it is also impacted by flood stages of the Missouri River.<sup>9</sup>

With no engineered or natural barriers, the radioactive wastes were dumped in Area 1 loose and uncontained in the form of fine particles with the consistency of talcum powder, ostensibly as landfill cover. There they have been left free to migrate over the past 40 years.

According to leading area geologist, Prof. Robert Criss, “any percolating waters can encounter radwaste and then move laterally and downward into the alluvial aquifer, or into the bedrock aquifer in the subjacent Mississippian limestone.”<sup>10</sup>

Of further note, those four decades include many major floods in 1984, 1985, 1995, 2008, 2011, and most spectacularly, the Great Flood of 1993, which was among the most devastating in United States history.<sup>11</sup> Their repeated impact on groundwater action that mobilizes contaminants, including at the Westlake/Bridgeton landfill, was profound. See FIGURE 1.



**FIGURE 2—Before and after Great Flood of 1993 at confluence of Missouri and Mississippi Rivers north of St. Louis**  
Photo Credit: NASA

### **Groundwater Tests Establish Migration of Radioisotopes Throughout Landfill**

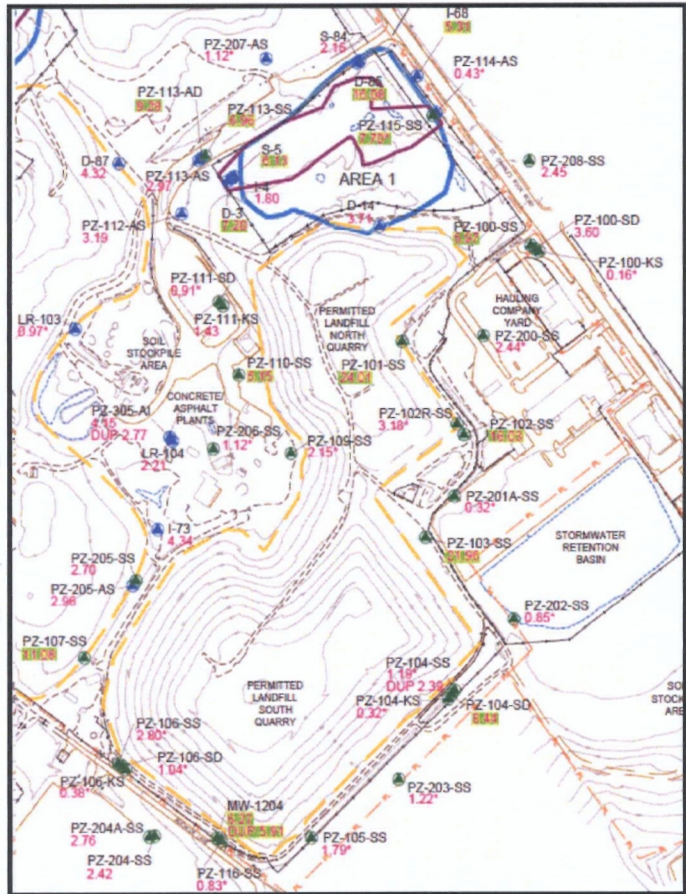
A close examination of the groundwater monitoring records compiled by Republic in 1996, 2004, 2012 and 2013 show there were high levels of radioactivity have dispersed throughout the landfill. Of note, the first time the migration of radioisotopes became conclusive was in the 2012 tests, although it is not known whether the spike occurred a few years earlier, because the last set of tests prior to that time was in 2004.<sup>12</sup>

FIGURE 3 shows the location of the functioning groundwater wells around the Bridgeton Landfill in 2013, with the readings for Total Radium 226/228 in units of picocuries per liter (pCi/l), shown in pink next to each well, and those readings above the regulatory standard of 5 pCi/l maximum contaminant level (MCL), highlighted in green.



TABLE 1 on the following page highlights in tabular form the reported levels of radioactivity (again in picocuries per liter) in excess of background levels of  $\approx 2$  pCi/l<sup>13</sup> since 1996, with the wells showing exceedances in any test rearranged so as to be grouped by their location in the landfill (see the NOTE for an explanation of the abbreviations). The values are shaded from blue (lowest) through yellow and orange to red (highest) in order to highlight the wells with the greatest reported emissions.<sup>14</sup> Also, in contrast to MCLs used by Republic, the baseline in this TABLE, against which to measure changes in levels of radioisotopes over time, are the background levels previously found by EPA7. We use background levels because MCLs are purely a regulatory artifice without any particular meaning to assess how extensively the radioactive wastes dumped loose and uncontained in Area 1 have migrated over 40 years.

The TABLE shows 33 locations out of the total 49 wells around the periphery of the landfill in which emissions exceeded background at one or more tests over the past 17 years. In the last test in October 2013, there were 27 wells reporting decay rates above background levels, and 14 above MCLs.



**FIGURE 3 – Map of groundwater wells around Bridgeton Landfill in 2013**

Therefore, the company's own data demonstrates that, for the past three to five years, it has no longer been possible to construct a barrier at the south end of Area 1 that would circumscribe all of the dangerous radioactive wastes illegally dumped there in 1973. That horse has left the barn. As a lesson learned, had Republic constructed the barrier in 2010 when the underground fire was first detected and the radioactive wastes were still contained, the proposed barrier could have maintained separation between the fire and those wastes

At every turn, instead of undertaking the urgently needed measures to protect public safety, the regulator with jurisdiction, including this agency, has acquiesced to Republic's reckless policy of doing and spending the least possible to remediate the noncompliant, nonrevenue producing, site. This began with the company's refusal to construct a compliant low permeable final cover when, in an attempt to prevent odors and subsurface methane migration, it installed gas collection pipes in 2006; through its refusal to install a barrier in the narrow neck between the two quarries in 2012; through to today when it is being allowed procrastinate on digging the trench around Area 1. While the Missouri DNR commendably began to privately force the issue in 2013, EPA7, which has jurisdiction over the barrier (and exhumation of Areas 1 and 2), has sofar remained single-mindedly oblivious to its legal and ethical responsibilities.



**WEST LAKE/BRIDGETON LANDFILLS**  
**RADIUM EXCEEDANCES IN GROUNDWATER WELLS**  
**(Ordered by Location)**

	Well	Location	Total Ra-0226/228 in Grndwtr>2pCi/L				
			10-2013	3-2013	2012	2004	1996/1997
RIM	D 85	ATC	9.55	16.08	13.79	<5	<5
	D 3	AMC	8.34	7.20	10.22	7.75	7.50
	PZ 115 SS	AMC	7.71	7.70	6.20	-	-
	S 5	AML	6.5	6.13	0.67	<5	NT
AREA 1	S 84	ATC	4.18	2.16	3.26	<5	NT
	PZ 113 SS	ATL	2.12	6.96	1.91	5.80	5.80
	I 68	ATR	5.07	5.31	4.72	<5	<5
	PZ 112 AS	AML	5.66	3.19	5.82	-	-
	PZ 113 AD	AML	7.96	9.28	11.12	<5	NT
	PZ 113 AS	AML	0.65	2.97	0.84	-	NT
	PZ 208 SS	AMR	3.08	2.45	0.83	-	-
	D 14	ABC	5.35	3.74	5.17	-	-
	PZ 100 SD	NTR	3.22	3.60	2.74	-	NT
NORTH QUARRY	PZ 100 SS	NTR	6.03	5.97	4.23	-	<5
	PZ 101 SS	NMR	27.14	24.01	16.19	-	-
	PZ 200 SS	NMR	2.92	2.44	7.74	-	-
	PZ 202 SS	NMR	2.92	0.85	4.58	-	-
	PZ 110 SS	NBL	8.23	5.15	6.59	-	<5
	PZ 102 SS	NBR	8.23	16.03	9.38	-	<5
	PZ 102R SS	NBR	3.25	3.18	4.52	-	<5
NECK	PZ 109 SS	KML	2.8	2.15	5.30	-	NT
SOUTH QUARRY	I 73	STL	1.9	4.34	0.96	-	-
	PZ 103 SS	STR	10.88	21.96	6.06	-	NT
	PZ 107 SS	SML	9.42	11.08	8.95	-	NT
	PZ 205 SS	SML	2.27	2.70	1.73	-	-
	PZ 104 SD	SMR	4.08	8.44	3.09	-	<5
	PZ 104 SS	SMR	1.99	1.19	3.09	-	-
	PZ 106 SS	SBL	3.31	1.04	5.22	6.33	-
	PZ 1201 SS	SMR	-	-	-	-	5.74
	PZ 204 SS	SBL	0.88	2.42	1.10	-	-
	PZ 204A SS	SBL	1.82	2.76	2.34	-	-
	MW 1204	SBC	8.18	8.27	6.68	-	-
	PZ 106 SS	SBR	3.31	2.80	5.20	-	6.33

TABLE 1

Further reinforcing this picture of widespread radium migration from Area 1, elevated levels of radioactivity have also been found in analysis of the landfill's leachate. High radium levels of the leachate formed as infiltrating rain percolates through the garbage (and the groundwater that surrounds it) inside the landfill were very similar to the high readings in the wells on the perimeter of the landfill. Through the beginning of April 2013, they were from <11 pCi/l to >20 pCi/l. By the end of that month, however, radium levels in the leachate soared to an apex of >200 pCi/l. Noteworthy, that was coincident in time with a rapid elevation in subsurface temperatures beginning in late March of that year, which can be expected to significantly increase mobilization of the radionuclides.<sup>15</sup>



## USGS Groundwater Study

A just completed US Geological Survey (USGS) study undertook extensive analysis of the last three groundwater tests and found that the observed occurrence of elevated radium isotope levels around the landfill perimeter above the 5 pCi/l MCL is statistically significant, even at the 99.999% confidence level–

“Concentrations of dissolved combined radium were significantly larger (p value less than 0.00001) in samples from alluvial or bedrock monitoring wells affected by leachate compared to samples from monitoring wells at the site that do not have leachate effects.”<sup>16</sup>

At the same time, the USGS does go on to raise a question whether the observed elevated readings for radium above maximum contaminant levels (MCLs), which were statistically significant to a near certainty, are from other sources than the radium that was originally dumped, in powder form, loose and uncontained, in Area 1 forty years ago. Specifically, the agency suggests as hypotheticals that, first, the radium found in the groundwater wells, conceptually, might have been mobilized from the underlying limestone; second, leached from the regular garbage dumped at Bridgeton; or, third, it could be nothing more than normal variability in the site’s natural background radiation.<sup>17</sup> The USGS also presents doubts that it sees in the otherwise logical connection between the wastes and elevated readings.

However, the USGS’s speculative search for other explanations in the face of statistical certainty flies in the face of internal logical inconsistencies, and is also directly contradicted by key data. Perhaps they are exercising the limits of their imagination, but, in any case, they have failed to present a credible alternative hypothesis to the obvious conclusion.

*Mobilized from limestone.* As to their first alternative, the USGS’s primary option is that the radium found in the periphery groundwater wells was mobilized from the trace natural deposits in the underlying limestone. However, if the elevated radium in the wells surrounding the landfill had not predominately migrated out of Area 1, but instead had been largely mobilized from the bedrock limestone and diffused into the area’s groundwater, then two fundamental questions would have to be answered. For one thing, why in that contemplation are the high radium readings, which would have then spread throughout the area’s groundwater, found only in the periphery of the landfill and not also in area wells further away? Why, too, for another, if the high readings came from trace radium laid down in earlier epochs, had it only come to notice in the last two years?

Directly contradicting the first necessary precondition for their hypothesis to be true, background radium levels for the entire area, distinct from at the landfill, are  $\approx 2$  pCi/l,<sup>18</sup> not the 20-30 pCi/l recurrently found around the edge of the facility – which is 10× to 15× greater. Furthermore, that is in addition to the 200 pCi/l spike in the landfill’s leachate.<sup>19</sup> In comparison, not one single reading above 4 pCi/l has been found in any area wells away from the landfill.<sup>20</sup>

1 Disproving the other necessary condition for the limestone theory, the USGS analysis  
2 focused only on the groundwater reports for 2012-2013, by which time the radium contamination  
3 had already become prevalent. Had the USGS compared these observations to the earlier tests  
4 done in 1995, 1996, 1997 and 2004, which were referenced earlier, to that done in 2012 and  
5 2103, they would have seen that elevated radium readings were not observed until 2012. That is  
6 to say, unexplained is how naturally occurring uranium's and thorium's decay chain, which  
7 originated in earlier epochs, only surfaced just now.

8 The question is whether the evidence suggests that the elevated radium readings around  
9 the landfill first observed in 2012 stem from the radioactive wastes dumped at Area 1 in 1973, or  
10 from the limestone bedrock laid down millions of years ago. Any rational assessment should have  
11 included asking whether the timing of those first observations bore a closer logical relationship to  
12 the timing of one or the other alternative sources. Inexplicably, the USGS did not think to ask.  
13 Had they done so, they would have seen that first observation bore a coincident relation in time to  
14 the dumping, and none to the limestone. Indeed, the relatively minor forty years from the illegal  
15 dumping seems reasonable in light of the fact that radium is relatively insoluble, but six major  
16 floods will eventually provide sufficient groundwater action to mobilize even recalcitrant isotopes.

17 *Leached from industrial wastes.* As to the second alternative, whether sufficient radium  
18 leached out of the industrial garbage buried in the north quarry to produce those highly elevated  
19 readings, it is difficult to discern whether the USGS means this hypothetical to be treated  
20 seriously. For they have not even attempted to speculate on what industrial activity in the St.  
21 Louis region could have been the source of sufficient volumes of radium to contaminate the  
22 aquifer across the 50 acres that constitute the landfill.

23  
24 For example, radium dial painting was done in Orange, New Jersey, Waterbury,  
25 Connecticut and Ottawa, Illinois, but not in or near enough for its waste to be commercially long-  
26 hauled to St. Louis.<sup>21</sup> Modern medical treatments in hospitals both generate too little radium to  
27 contaminate a 50-acre site, and also have been red-bagged and not landfilled for 27 years, which is  
28 also too long ago to explain the recent appearance of elevated radium readings. That transition for  
29 hospital wastes began in 1987, when a 30-mile garbage slick composed primarily of medical and  
30 household wastes closed many New Jersey and New York beaches, and led to regulations that  
31 require red bagging medical wastes for special disposal.<sup>22</sup> Similar for demolition projects that  
32 might contain relatively minor radium residues.

33 *Natural variation in background radiation.* But, in the last two years, are the recurring  
34 radium readings observed over 20 pCi/l, and even 30 pCi/l – and also the 200 pCi/l spike in the  
35 leachate just as the fire flared – purely random fluctuations around background levels, as the  
36 USGS ruminates? Its own study disproves that possibility. On the page before the USGS asks  
37 itself this question, the Survey concluded that just the well exceedances, even before accounting  
38 for the off-scale leachate numbers, are so improbable in comparison to the surrounding landscape  
39 that they would only be expected due to a rare statistical fluke 0.001% of the time. Were EPA7 to  
40 adopt the USGS's evidentiary standard in which no conclusions could be drawn until affirmative  
41 proof was that certain, the agency would find it difficult to confirm that the sun will rise the next  
42 day in the East from watching the direction of first light each morning, over 365 days each year,  
43 for 273 years.



1           *USGS doubts.* All the options that the USGS puts forward fail the fundamental test of  
2 internal consistency. Yet, they remain unable to see a convincing connection between the radium  
3 dumped loose and uncontained in Area 1 forty years ago in the Missouri River flood plain, and the  
4 elevated radium readings in the groundwater wells around the landfill today. At its root, the  
5 USGS relies less for its skepticism on viable alternatives that have supporting data, and more on  
6 doubts it believes clouds the otherwise obvious connection. Their doubts involve, first, spatial  
7 relationships, and, second, isotopic signatures.

8           Spatial relationships. First, the USGS repeats earlier representations by Republic and  
9 EPA7 by arguing that there is not a sufficiently strong spatial relationship between Area 1 and the  
10 observed exceedances to draw a connection between them.<sup>23</sup> However, as discussed at page 3,  
11 the complex interactions of flood stages, droughts and sump pumps at the site results in large  
12 disruptive changes in groundwater flows that makes it essentially unlikely to impossible to discern  
13 a spatial relationship. Any protrusion of radioactivity out of Area 1 from leaking radium particles  
14 would be repeatedly severed from its source by those abrupt changes in subsurface flows.

15           Another way to visualize this is from an examination of TABLE 1 on page 5, which shows  
16 the readings for each affected groundwater well over time. Twenty-one of the 33 wells that had  
17 exceedances on at least one of the five sets of tests between 1995 and 2013 saw the readings  
18 reverse direction from the prior trend by more than 25% at least once. See, as an example, Well  
19 PZ-104-SD, which shows 3.09 pCi/l in 2012 and then 8.44 pCi/l at the beginning and 4.08 pCi/l at  
20 the end of 2013; or PZ-200-SS, which, in the reverse direction, showed readings of 7.74, 2.44  
21 and 2.92 pCi/l. By looking at changes at a single location across time, whatever spatial issues the  
22 USGS envisions are stripped out. It is the erratic effects of shifting groundwater flows, which are  
23 also disruptive of spatial relationships, that is isolated in this TABLE and are the reason for the  
24 spatial dislocation of the high reading from the source, as it is of the discombobulation of any  
25 linear trend. Some concerns exist about different laboratories' testing accuracy, but the readings  
26 over time vary in opposite directions too often for the differences to all be due consistent  
27 measurement error at one lab.

28           Moreover, to the same point, the USGS repeats the identical mistake made by the  
29 company and agency, for they all misunderstand which wells should be spatially downgradient of  
30 Area 1 to show radium exceedances, according to Prof. Criss based on EMSI's potentiometric  
31 surface maps.<sup>24</sup>

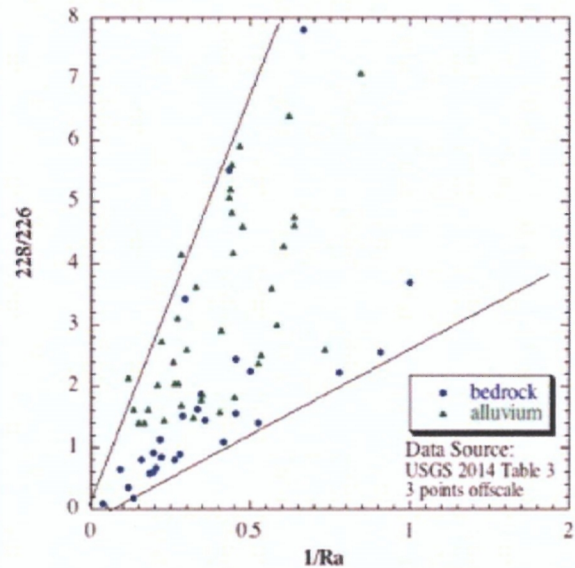
32           In this setting, amidst a flood plain and sump pumps, the USGS's demand for spatial  
33 continuity simply makes no sense. Repetition does not make non-sequiturs into useful metrics.

34           Isotopic signatures. Second, the USGS is concerned that the isotopic signature of the  
35 radium in the wells may be different from that in Area 1. That signature in question involves the  
36 two primary radium isotopes, Ra-226, which is a byproduct of uranium decay, and Ra-226, which  
37 is from the thorium decay chain. The two isotopes of radium in the environment can vary in their  
38 relative proportions, depending on the relationship over time of uranium and thorium in the  
39 source material. The ratio of Ra-228 to Ra-226, the USGS argues, was so much less in Area 1  
40 than in the groundwater wells around the landfill, this suggests to them that the elevated radium  
41 readings in the wells could have come from somewhere else, pointing to the limestone bedrock.<sup>25</sup>

However, as discussed above on page 6, the limestone hypothesis is internally inconsistent with the facts, because any trace radium is exceedingly unlikely to have remained immobile so many million years only to be released by iron oxide in the last three years and then have aggregated only on the landfill's perimeter and not anywhere else.

More important, USGS's data interpretation has no value, because the protocols it used to reach its conclusion, as were described in its report, are fatally flawed. Critically, the study states that the sampling in Area 1 was limited to readings greater than 30 pCi/l, while the sampled groundwater wells, it says, were those reporting greater than 5 pCi/l.<sup>26</sup> Unfortunately, this comparison of apples to oranges insures false conclusions because of other correlations embedded in the data.

This is because the totality of the relevant data points from the groundwater studies shows that low 228/226 ratios are strongly associated with high total radium concentrations. See FIGURE 4 by Prof. Criss which is compiled from the USGS's TABLE 3. Since the USGS's lopsided sampling was limited to only the very highest readings in Area 1, its improper sampling skewed the analysis by lowering the 228/226 ratio at that site due to those correlates, not because there is a real difference between the 228/226 ratio in the total population in Area 1 compared to the perimeter of the landfill.



**FIGURE 4- Ratio of Radium 228/226 to Total Radium 228/226 Levels** Prepared by Prof. Robert Criss

The USGS attempts to justify its incorrect sampling by stating it limited its samples from Area 1 to those that showed more than 30 pCi/l because it considered samples with lower decay rates to be unrelated to radioactive impacted material (RIM).<sup>27</sup> But, that makes no sense. Anything over one standard deviation above the mean background level for radium of 2 pCi/l could properly be considered RIM, or to be conservative, anything over 4 pCi/l, which is the highest background reading recorded in the surrounding area unaffected by the Latty Avenue wastes dumped in Operating Unit 1.<sup>28</sup> Critically, no justification is articulated why a threshold 8 times greater than the highest background level is needed to establish that a sample is contaminated by the radioactive wastes from Latty Avenue.

Also, the USGS is using current data for the 228/226 ratios in the well readings, but nearly 20-year old data for the Area 1 ratios. This is also of great concern to the attempted comparison because the two isotopes of radium have dramatically different half lives. Ra-226's half-life is 1600 years, while Ra-228's is 5.75 years. That is to say, the denominator will remain constant, while the numerator may cycle more than three times, depending upon myriad assumptions.



1 This mismatch forced the USGS to attempt to true up the 18 year old data to 2014, and  
2 that led to a wide range of estimates for the current Ra-228/226 ratio in Area 1 of from 0.001 to  
3 0.06, or a range of 60 times,<sup>29</sup> which is far too wide to have any conceivable analytical utility. The  
4 USGS's modeling that attempted to resolve these enormous uncertainties were, themselves, based  
5 upon so many other assumptions as to be useless. Not only does USGS need to use consistent  
6 sampling procedures, but also it needed current, not badly outdated, data to draw meaningful  
7 comparisons between 228/226 ratios in different areas.

8 Finally, as Prof. Criss states, the FIGURE further defines an endmember with a high Ra  
9 content that is associated with a low 228/226 ratio (noting that setting the X-axis as  $1/Ra$  has the  
10 effect of placing high radium levels closer to the origin). The graph shows that material with high  
11 radium levels, but low Ra-228/226 ratios, is mixing with a variety of other endmembers  
12 with a much lower Ra content and variable, but higher, Ra-228/226 ratios, which most probably  
13 represents various sediments and rocks. This relationship of a high Ra component with a low  
14 228/226 ratio is exactly what would be expected to arise from the radioactive wastes dumped in  
15 Area 1.

16 The only relevant conclusion from the USGS report is its only factual statement. That is  
17 the fact that the widely dispersed elevated readings are highly statistically significant, not its  
18 strained attempts to speculate on the remote possibility of uncertainty where no reasonable person  
19 could discern it. Their effort to manufacture doubt where no basis has been shown flies in the face  
20 of the evidence.

## 21 **Conclusion**

22 For these reasons, any further exertions by Republic for additional time to make yet more  
23 refinements in the proposed barrier's alignment, or attempt to divert to other palliative efforts,  
24 cannot be considered anything more than a smokescreen to delay the project until the fire  
25 approaches too close to complete work. Staging for and excavation of the barrier trench across  
26 the southern most edge of Area 1, with whatever minor modifications Republic proposes by  
27 month's end, should begin as soon as weather permits.

28 Previously, Republic hewed scrupulously to an interminable wait-until-the-last-moment,  
29 trigger process, the end result of which would, as DNR stated, have insured nothing could be  
30 done until it was too late. Under mounting pressure from the State of Missouri,<sup>30</sup> in September of  
31 2013, Republic finally abandoned its attenuated step-wise plan and purported it would move  
32 immediately to construct the isolation barrier under EPA's jurisdiction.<sup>31</sup>

33 Since that time Region 7 has let itself become complicit in Republic's slow-walk strategy  
34 to find that non-existent clean alignment. First this was done with futile gamma cone testing, and  
35 then down hole bore testing, followed now, as if there were no limit to Region 7's credulity, with  
36 yet another variant on heat extraction wells, but which, as the Department's consultant has  
37 warned, raises the risk of worsening the fire's intensity.<sup>32</sup>

1 This project was originally promised to commence ten months ago. Not only has that not  
2 happened, but we are advised that there is a minimum of another year-and-a-half more to start  
3 digging so that the company, with its indulgent regulators in tow, might pursue that clean cut  
4 delusion.<sup>33</sup> The two years consumed by these ploys has been to the incalculable detriment of the  
5 downwind population and to the economy of North St. Louis.

6 Should the fire, which is through the neck, break out into the North Quarry, as may have  
7 already happened, there is also the non-trivial probability that the fire may rapidly leap ahead to  
8 Area 1 and foreclose any realistic chance to install a barrier. This is because the fire from the  
9 south quarry could be accelerated by the existing fire-like conditions in the center of the north  
10 quarry, and get too close to Area 1 to any longer open a trench that lets in oxygen that feeds fire.

11 Discounting the importance of the elevated temperatures in the north quarry because  
12 carbon monoxide levels are not also high, as they would be in typical fires, misunderstands the  
13 complexity of chemical reactions inside a landfill. More likely, the persistent high temperatures in  
14 the north quarry, which may date back to 1992, are evidence of metal-water reactions, like the  
15 aluminum dross fire that Republic caused at its Countywide Landfill in Ohio.<sup>34</sup>

16 EPA should follow Missouri's recommendation, and direct Republic to commence digging  
17 the barrier now through the contaminated waste mass, using controlled tenting to reduce odors  
18 and address the airport's concerns about impacts to aviation. The sooner that this can happen, the  
19 sooner planning can commence to the next urgent task. That is to exhume the dangerous  
20 radioisotopes in both Areas 1 and 2. For an isolation barrier, while urgently needed to prevent an  
21 immediate crisis, will do nothing to protect the radioactive wastes against flooding or from  
22 groundwater contamination, both of which exist and pose dire threats in the future to the area and  
23 the people who live there. Finally, there is the need to evacuate those downwind who are now  
24 being exposed to excess levels of alpha particles from migrating radium that has been volatilized by  
25 the fire, which will be the subject of our next communication.

26 Sincerely,

27 **CENTER *for a* COMPETITIVE WASTE INDUSTRY**

28 *Peter Anderson*

29 By \_\_\_\_\_  
30 **PETER ANDERSON**  
31 *Executive Director*

32 PA/ch

33 cc: Hon. Chris Koster  
34 Mr. Chris Nagel  
35 Mr. Todd Thalhalmer  
36 Hon. Ginny McCarthy  
37 Mr. Mathy Stanislaus

Chairperson Amy Legare  
Hon.. Claire McCaskill  
Hon. Roy Blunt  
Hon. Wm. Lacy Clay  
Hon. Ann Wagner



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## ENDNOTES

- 1       Bridgeton Landfill LLC, *Isolation Barrier Alternatives Analysis West Lake Landfill Superfund Site*, dated October 10, 2014, to U.S. Environmental Protection Agency Region 7, dated October 10, 2014 (Republic Report), at p. 3.
- 2       Missouri Department of Natural Resources (DNR) letter-comments on the Republic Report, dated November 24, 2014 (DNR Comments), at p. 3.
- 3       Foss-Smith Dissertation, at p. 21.
- 4       Robert Criss, *Risk and Character of Radioactive Waste at the West Lake Landfill, Bridgeton, Missouri* (February 21, 2013), at p. 5.
- 5       40 CFR §§258.11 and 258.40(a)(2).
- 6       Republic, *Operation, Maintenance, and Monitoring Plan, Volume 2, Gas and Subsurface Control Systems* (September 2013), at FIGURE 1.
- 7       Republic, Bridgeton Landfill North Quarry Action Plan (November 12, 2013) (Second North Quarry Action Plan), at Sheet 3, at PDF p. 42.
- 8       EPA Region 7, *Record of Decision on West Lake Landfill OU-1* (2008), at p. 18, and FIGURE 5-6 on p. 67.
- 9       Engineering Management Support, *Supplemental Feasibility Study Radiological-Impacted Material Excavation Alternatives Analysis - West Lake Landfill Operable Unit-1* (December 28, 2011) (Supplemental Feasibility), at Figure 17.
- 10      Robert Criss, *Risk and Character of Radioactive Waste at the West Lake Landfill, Bridgeton, Missouri* (February 21, 2013), at p. 6. The description of the form of the radioactive wastes is from a conversation with Ms. Kay Drey, February 13, 2013, in which she recounted her conversation with one of the drivers who trucked those wastes from Latty Avenue to Westlake Landfill.
- 11      Robert Criss, *Risk and Character of Radioactive Waste at the West Lake Landfill, Bridgeton, Missouri* (February 2013), at p. 5.
- 12      Supplemental Feasibility, at FIGURE 17; EMSI, *Groundwater Monitoring Report 2012 Additional Groundwater Sampling Event West Lake Landfill Operable Unit-1* (December 24, 2012), at FIGURE 8; EMSI, *Groundwater Monitoring Report April 2013 Additional Groundwater Sampling Event West Lake Landfill Operable Unit-1* (July 8, 2013), at FIGURE 7. The groundwater tests in the 1990s were done in 1995, 1996 and 1997. For readability, the text refers to the three collectively as 1996.
- 13      EPA Region 7, *Record of Decision on West Lake Landfill OU-1* (2008), at TABLE 5-6 on PDF p. 98.
- 14      The data was compiled from the reports for Total Radium 226/228 in NOTE 12. To indicate the location of the reported readings for each well with exceedances, the second column in the FIGURE uses an abbreviation system as shown below:

**Abbreviations in Location Column**

**1st Digit**

**A**                    **Area 1 (italicized if in RIM)**

**N**                    **North Quarry**

**B**                    **Bottleneck**

**S**                    **South Quarry**

**2nd Digit**

**T**                    **Top**

**M**                    **Middle**

**B**                    **Bottom**

**3rd Digit**

**L**                    **Left**

**C**                    **Center**

**R**                    **Right**

A subsequent groundwater study was done in July following the April 2013 sampling. The results of that sample are consistent with the trend of the prior sampling periods. Republic, *Bridgeton Landfill-Groundwater Monitoring Report* (December 1, 2013).

15       Compare Republic, Excel Spreadsheet of Leachate Radiation Levels, provided by MDNR under OR25387 Open Records Request (January 9, 2013) (Leachate Spreadsheet) to Republic, Monthly Reports to MDNR Under First Agreed Order.

16       USGS Study, at p. 2.

17       USGS Study, at p. 3.

18       EPA Region 7, *Record of Decision on West Lake Landfill OU-1* (2008), at TABLE 5-6 on PDF p. 98.

19       See NOTE 11.

20       USGS Study, at pp. 1 and 45.

21       Ross Mullner, *Deadly Glow: The Radium Dial Worker Tragedy* (American Public Health Association, Washington, DC, 1999).

22       42 U.S.C. § 6992.

23       USGS Study, at p. 2.

24       Robert Criss, *Risk and Character of Radioactive Waste at the West Lake Landfill, Bridgeton, Missouri* (February 2013), at p. 6.

25       US Geological Study, *Background Groundwater Quality, Review of 2012-2014 Groundwater Data, and Potential Origin of Radium at the West Landfill Site* (December 17, 2014) (USGS Study), at p. 3.

26       USGS Study, at p. 28.

27       USGS Study, at p. 28.

28       EPA Region 7, *Record of Decision on West Lake Landfill OU-1* (2008), at TABLE 5-6 on PDF p. 98.

29       USGS Study, at p. 28.



- 30 Letter from Attorney General Chris Koster to EPA Region 7 Administrator Karl Brooks, dated March 28, 2014.
- 31 Republic, *Bridgeton Landfill – North Quarry Contingency Plan* – Part 1 (June 27, 2013) at p. 13.
- 32 Memorandum from MDNR Consultant Todd Thalhamer, P.E. and Timothy Stark, Ph.D., P.E., D.GE, re:  
Comments on the Draft Bridgeton Landfill North Quarry Contingency Plan – Part 1, dated July 22, 2013, at p. 7.
- 33 U.S. Army Corps of Engineers, *Isolation Barrier Alignment Alternatives Assessment West Lake Landfill  
Bridgeton, Missouri* (August 25, 2014).
- 34 Eugene Meyer, *Chemistry of Hazardous Materials* 5<sup>th</sup> Ed. (Brady Publishing, 1977); Bob Downing, “Little  
evidence that fires are slowing at Stark landfill,” *Beacon Journal* (January 10, 2013).